

What is claimed is:

1. A relay unit of a power line communication device for a vehicle inserted to a power line connecting between power line communication devices for a vehicle configured to superimpose a communication signal on direct-current power on the power line provided to supply the direct-current power to a vehicle and then transmit, wherein the relay unit is configured to relay the communication signal between the power line communication devices for a vehicle, said relay unit of a power line communication device for a vehicle comprising:

a separator inserted to the power line provided to supply power to the power line communication devices for a vehicle and configured to block and separate the communication signal transmitted on the power line;

a first switch connected to one end of the power line separated by the separator;

a second switch connected to another end of the power line separated by the separator;

a first receiver configured to receive the communication signal provided from the power line through the first switch;

a second receiver configured to receive the communication signal provided from the power line through the second switch;

a first transmitter configured to output and transmit the communication signal received and relayed by the first receiver to the other end of the power line through the second switch;

a second transmitter configured to output and transmit the communication signal received and relayed by the second receiver to the one

end of the power line through the first switch; and

a processor configured to receive the communication signal received by the first receiver and relay the communication signal so as to provide the relayed communication signal to the first transmitter, to receive the communication signal received by the second receiver and relay the communication signal so as to provide the relayed communication signal to the second transmitter, and to switch-control the first and second switches.

2. A relay unit of a power line communication device for a vehicle inserted to a power line connecting between power line communication devices for a vehicle configured to superimpose a communication signal on direct-current power on the power line provided to supply the direct-current power to a vehicle and transmit, wherein the relay unit is configured to relay the communication signal between the power line communication devices for a vehicle, said relay unit of a power line communication device for a vehicle comprising:

a separator which inserted to the power line provided to supply power to the power line communication devices for a vehicle and configured to block and separate the communication signal transmitted on the power line;

a first switch connected to one end of the power line separated by the separator;

a second switch connected between another end of the power line separated by the separator and the first switch;

a receiver configured to receive the communication signal provided from the power line through any of the first switch and the second switch;

a transmitter configured to output and transmit the communication signal received and relayed by the receiver to any of the one end and the other end of the power line through any of the first switch and the second switch; and

5 a processor configured to receive the communication signal received by the receiver and relay the communication signal so as to provide the relayed communication signal to the transmitter, to judge a direction of transmission of the received communication signal based on a signal pattern of the communication signal, and to switch-control the first and second  
10 switches in accordance with a result of judgment.

3. The relay unit of a power line communication device for a vehicle according to claim 1,

15 wherein the relay unit is inserted to the power line connecting between the power line communication devices for a vehicle which are disposed in front and rear doors of the vehicle, and relays a communication signal transmitted between the power line communication devices for a vehicle through the power line.

20 4. The relay unit of a power line communication device for a vehicle according to claim 2,

25 wherein the relay unit is inserted to the power line connecting between the power line communication devices for a vehicle which are disposed in front and rear doors of the vehicle, and relays a communication signal transmitted between the power line communication devices for a vehicle through the power line.

5. The relay unit of a power line communication device for a vehicle according to claim 3,

wherein the relay unit is inserted to the power line connecting between the power line communication devices for a vehicle which are disposed in right and left doors of the vehicle, and relays a communication signal transmitted between the power line communication devices for a vehicle through the power line.

6. The relay unit of a power line communication device for a vehicle according to claim 4,

wherein the relay unit is inserted to the power line connecting between the power line communication devices for a vehicle which are disposed in right and left doors of the vehicle, and relays a communication signal transmitted between the power line communication devices for a vehicle through the power line.